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The Effect of 8 Weeks HIIT along with *Achillia millefolium* Consumption on Blood LDL Cholesterol in Middle Age Women

Sangtarash N[1]*, Sangtarash N[2] and Shishesaz M[3]

[1]*Department of Exercise Physiology, Islamic Azad University of Shoushtar, Iran*

[2]*Institute for Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran*

[3]*Department of Cardiology, Atherosclerosis Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*

Abstract

High serum LDL cholesterol level is proven factors underlying cardiovascular diseases that prove the necessity of measuring, control of this case in people aged 20 and older. Medicinal plants such as Achillia and aerobic exercise, each had desirable effects on reducing levels of harmful blood lipids. It seems that exercise along with Achillea cosumption can have more effect on reducing harmful blood lipids. Participants were 40 women with blood cholesterol above 200 mg/DL, with an average age of 35-50 years and were non-athlete. In this study, subjects were divided into four groups of 5 based on random method, 1-control group 2- Achillia 3-HIIT group 4-Achillia group at the same time as HIIT. The Achillia plant was prepared by the researcher and given to each participant in a separate 4-gram packet for 24 times. Group 2 and 4 boil their medicinal plants in 150 cc of water for 15-20 minutes and drink three times a week. Group 2 and 4 boil their medicinal plants in 150 cc of water for 15-20 minutes and drink three times a week. Group 3 and group 4 were obliged to perform 4-6 replications of 30-second Vingit test on the stationary bike with maximum effort. Group 3 and group 4 were obliged to perform 4-6 replications of 30 second Wingate test on the cycling Ergometer with maximum effort. The number of Wingate test performances increased during each training week and if the subjects could perform three replications in two consecutive sessions with the specified speed and load, 10% of the load would be added. The number of Wingate test performances increased during each training week and if the subjects could perform three replications in two consecutive sessions with the specified speed and load, 10% of the load would be added. Recovery between each replication was considered four minutes of passive rest. Recovery between each replication was considered four minutes of passive rest. The total activity time for this training protocol was considered 20 to 40 minutes. The total activity time for this training protocol was considered 20 to 40 minutes. In this study, Achiliia consumption had a significant effect on blood cholesterol levels. Similar results were also observed in HIIT and Achillia+ HIIT groups.

Keywords: *Achillia millefolium*; Blood cholesterol; HIIT; LDL cholesterol; Middle age women

Introduction

High LDL cholesterol and hypertension are the most important risk factors for atherosclerosis and coronary artery diseases. Currently, chronic diseases, especially atherosclerosis and hypertension, are considered as the most important health problems in undeveloped countries as well as developed countries [1]. Studies on people with unexpected deaths showed that people with risk factors such as high LDL and triglycerides, blood pressure and smoking had atherosclerosis lesions. LDL blood levels less than 200 mg/dl are introduced as normal blood cholesterol levels and higher levels of this number as high LDL cholesterol [2]. Many factors affect serum LDL levels that include a high fat diet, age, genetics, sex hormones (poor) Their knowledge after menopause or their presence during menstruation is medications (beta blockers, seaside diuretics), body weight, glucose tolerance, physical activity, diseases (diabetes, thyroid, liver, cancer, anorexia) and seasons [1]. People with high blood cholesterol levels have a higher risk of coronary heart disease. In these patients, increased blood cholesterol is a strong predictor of mortality due to coronary heart disease [2]. Coronary heart disease is caused by inadequate coronary artery flow. Atherosclerosis is the main cause of decreased coronary blood flow [3]. Due to the intensity of exercises, a HIIT effort may take several seconds to

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Correspondence:
Nagesh Sangtarash, Department of Exercise Physiology, Islamic Azad University of Shoushtar, Iran.
Tel: *98-916-115-2133*
E-mail: *sangtarash362@gmail.com*
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several minutes, when different stages are separated by a few minutes of rest or low-intensity activity [4]. The mechanism of this exercise is to The results of this study showed that a hit method increases the concentration of energy substrate and enzyme activity associated with anaerobic metabolism and then by increasing the tavater of severe repetitions and its implementation to Intermittent face along with recovery between the exercise stages changed the muscle cell requirement and metabolic pathways in a way that simultaneously involved the production of aerobic and anaerobic energy devices in the regeneration of adinosine triphosphate. Therefore, using these exercises, a wide range of metabolic and functional adaptations can be expected. Evidence suggests that if recovery time between severe tubes decreases, the share of glygolycemia for energy supply decreases and therefore aerobic metabolism increases to compensate for this energy loss [5]. There is little recognition about the effects of HIIT but the evidence is increasing, this type of exercise compared to moderate intensity continuous exercises, despite less time and less overall volume of exercise, causes more physiological stimulation [6]. These findings are very important from the public health perspective because it is stated that lack of time is one of the obstacles to regular participation in sports activities [6]. On the other hand, although high volumes of traditional aerobic exercise reduce the risk of cardiovascular diseases and blood cholesterol levels, they need more time to do it. Studies showed that in adults, six weeks of HIIT compared to traditional endurance training, led to a similar metabolic adjustment [7]. Recent research showed that compared to moderate intensity continuous exercise, HIIT can help improve more or equal physical health and cardiovascular health [8]. On the other hand, it is possible that simultaneous use of some medicinal plants along with physical activity can have a positive effect on decreasing blood lipid levels [9]. Achillia is a multi-year, herbivorous plant. This plant is native to Asia, Europe and North America and is cultivated in many parts of the world with temperate climates. In Iran, cultivation of this plant has been reported in Alborz, Damavand, Polour, Gachsar, Azerbaijan Candovan, Urmia and Neyriz. The confirmed applications of this plant include removing dyspepsia problems such as mild gastrointestinal spasms, improving liver diseases and wound healing. According to the researches, this plant is used for hemorrhoid bleeding, menstrual problems, and fixation of sweats. This plant is also a part of some combination drugs used to solve gall bladder and its channels. Achillia is used in combination with other plants as laxatives and cough fixers and relieves heart problems and varicose veins. It seems that these plants have antioxidant and anti-inflammatory effects [10]. In this study, the determined values of this plant were given to sparago-dooly fed diet with high fat for 30 days. Bleeding, clinical, biochemical and pathological tests were performed on the animals and a significant decrease was observed in triglyceride lipoprotein cholesterol, there was no effect of inflammation or liver damage [9]. In this study, the reduced effects of blood lipids on Achillea plant return to the flavonoids and sesquiterpens in the hydroalcoholic extract of this plant [9]. Considering the importance of reducing blood cholesterol levels in prevention of diseases leading to mortality and increasing life expectancy and quality of life of women and due to the decreasing course of useful time that women spend for physical activity and increasing their health level for different reasons, also with the aim of achieving natural compounds that can regulate lipid abnormalities such as cholesterol and have fewer side effects The effect of HIIT and Achillea plant consumption had not been studied so far, this study was conducted to determine the effect of HIIT and Achillea on women's increased cholesterol levels simultaneously.

Method

The volunteers were 40 non-athlete women with blood cholesterol above 200 mg/dl with mean age of 35-50 years. Among these volunteers, 20 patients were randomly selected and participated in this study. The inclusion criteria were: having LDL cholesterol above 200 mg/dl, not having a history of continuous exercise in the past year, not taking specific supplements or medicines in the past three months, smoking, and no heart disease (or Familial history of heart disease), thyroid, diabetes and gastrointestinal disorders. For this purpose, participants completed the medical records form and the PAR_Q physical activity questionnaire for screening and all subjects were ranked low risk based on ACSM ranking of the American Sports Medicine.

During a briefing, the research objectives and programs were explained by mentioning the possible risks to the participants and all participants signed the consent of the participants. All points related to herbal medicine and physical activity that subjects should have observed during the study period were provided to them. All subjects were given the same cups for preparing and drinking herbal medicine.

Blood samples were collected from the left-hand vein of each case 48 hours before the exercise and 48 hours after the last training session, in a sitting position and resting after twelve hours of fasting. All samples were collected from 7:30 am to 9 am in a medical laboratory.

LDL cholesterol was measured by enzyme method using Pars Azmoon company kit. All measurements were done automatically by AKyon30 Abbott USA. Truca IU standards were used for calibration and Trulab P and Trurab N kit of the Pars Azmoon Company were used for calibration. LDL cholesterol was calculated by the Friedwal Friedwald formula [11]. Therefore, the use of these formulas was not prevented because all subjects had triglyceride levels less than 400 mg/dl. Achillia was prepared from one of the farms of medicinal plants in Urmia and distributed among the subjects and the instructions for preparing them were provided to the subjects in printed form. Each subject was obliged to drink medicinal plant three times a week, which informed the researcher through message.

After each training session, data were recorded by the researcher and collected for final evaluation. The training program lasted eight weeks. The exercise consisted of 4-6 replications of 30-second Vingit test on the cycling Ergometer with maximum effort. The number of Wingate test performances increased every week and if the subjects could perform three replications in two consecutive sessions at the specified speed and load, 10% of the load would be added. Recovery time between each replicate was considered four minutes of passive rest. The total activity time was considered 20-40 minutes for this training method. In this method, subjects were asked to perform the maximum effort. At the end of each training session, subjects were asked to cool their body for 5 minutes by stretching and walking [4].

24 packets of 4 g Achillia plant were prepared by the researcher. Each person was obliged to boil and drink a packet of Achillea plant in 150 cc of water 3 times a week for 6 weeks [9].

To interpret the results of the study, in quantitative variables, mean and median was used to describe the data center and standard deviation and inter-chart range were used to describe the data distribution. Wilcoxon, Chromitdal-Wallis and ANOVA tests were used for data analysis. Normality of data was done using Shapirvillek

Table 1: The results of descriptive information about the four groups, including mean, standard deviation, median.

Grope	Control	Achillia	HIIT	HIIT+Achillia
SD±mean	80/232±32/90	231/80±30/32	235/80±34/94	247/20±32/63
Middle	228 (62)	234 (55/50)	235 (60)	254 (63)
P-Value	0/872	0/872	0/872	0/872

Table 2: The results of the subjects in terms of LDL cholesterol level after training and Achillea consumption.

Grope	Control	Achillia	HIIT	HIIT+Achillia
SD±mean	226/60±31/05	191/20±16/32	181/20±16/93	147/20±17/02
Middle	221 (58)	192 (30)	177 (32/50)	149 (33/50)

Table 3: Validity or inaccination of the hypothesis whether taking 4 g Achillea three times a week for eight weeks affects the reduction of blood cholesterol levels.

Achillia grope	Pre test	Post-Test	*P*-value
SD±mean	32/30±80/231	32/16±20/191	043/0
middle	(50/55)234	(30)192	-

Table 4: HIIT has an effect on the reduction of blood cholesterol.

Grope HIIT	Pre test	Post test	*P*-Value
SD±mean	94/34±80/235	93/16±20/181	043/0
middle	(60)235	(50/32)177	-

Table 5: Validity or inaccination of the hypothesis whether Achillia consumption simultaneously with HIIT three times a week for eight weeks affects the reduction of blood cholesterol levels.

Grope HIIT	Pre test	Post test	*P*-Value
SD±mean	94/34±80/235	93/16±20/181	043/0
Middle	(60)235	(50/32)177	-

test and Q-Q chart. Covariance analysis was used to analyze the data in a multivariate way (to compare the groups with control of variables before treatment). All analysis was performed using SPSS version 22.

Results

Describing individual characteristics of subjects

Demographic characteristics of the subjects were assessed for an LDL cholesterol level. As can be seen in pre-test stage, none of the groups were significant at *P*-Value=0.05 which is addressed in Table 1.

Description of research findings

The results of the subjects are presented for an LDL cholesterol level after training and Achillea consumption in the Table 2.

Wilcoxon statistical method was used to investigate the validity or inaccination of the hypothesis whether taking 4 g Achillea three times a week for eight weeks affects the reduction of blood cholesterol levels. At the significant level of 0.05, the effect of Achillea consumption was significant (*P*=0.043) which means that Achillia consumption has an effect on blood cholesterol reduction (Table 3).

To investigate the validity or incorrectness of this hypothesis, whether HIIT is effective in reducing blood cholesterol three times a week for eight weeks, the Wilcoxon statistical method was used, at the significance level of 0.05, the effect of HIIT was significant (*P*=0.043) and this means that HIIT has an effect on the reduction of blood cholesterol (Table 4).

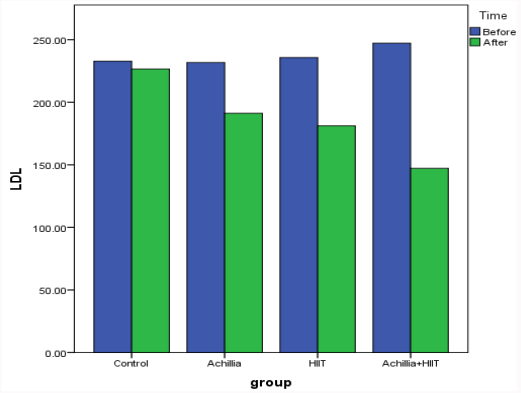

Chart 1: Comparison between the groups in terms of blood levels of LDL cholesterol in pre-test and post-test stages.

Table 6: Comparison table of LDL blood cholesterol level in control group with other groups in post-test.

Grope	B	SE	90%CI	*P*-Value
LDL-C_before	86/0	21/0	74/0±44/0	001/0>
control_Achillia	39/2	36/2	31/22±32/47-	001/0>
control_HIIT	64/0	92/1	65/34±68/59-	001/0>
control_Achillia+ HIIT	47/0-	24/2	18/75±59/100-	001/0>

B=Unstandardized coefficient
SE=Standard Error
CI=Confidence Interval

Table 7: Containing two-by-two group comparison with LDL cholesterol levels.

Grope	B	SE	95%CI	*P*-Value
Achillia_HIIT	35/12-	87/5	17/0±87/24-	053/0
Achillia_HIIT+Achillia	06/53-	97/5	34/40±78/65-	001/0>
HIIT_HIIT+Achillia	71/40-	92/5	09/28±33/53-	001/0>

Wilcoxon statistical method was used to investigate the validity or inaccination of the hypothesis whether Achillia consumption simultaneously with HIIT three times a week for eight weeks affects the reduction of blood cholesterol levels. At the significant level of 0.05, the effect of HIIT+ Achillia was significant (*P*=0.043), which means that HIIT+ Achillia has an effect on blood cholesterol reduction (Table 5). The Chart 1 compares the blood levels of LDL cholesterol in pre-test and post-test stages.

On post-test stage, all three groups showed significant differences in comparison with LDL cholesterol levels in the groups. The significance level was considered to be 0.05 (Table 6).

As can be observed in the (Table 7), in post-test stage, covariance analysis was used in comparison with blood levels of LDL cholesterol in groups, and covariance analysis was used at the significant level of 0.05, all three groups showed a significant difference. Compared to HIIT and consumer groups of Achillia, the exercise group showed more effect than Achillia in reducing LDL cholesterol levels. Compared to the consumer group Achillia alone and the HIIT group alone with HIIT+ Achillia group, the HIIT + Achillia group showed more effective than the other two groups on reducing LDL cholesterol.

Conclusion

The aim of this study was to investigate the effect of Achillea plant consumption along with HIIT exercise on increased blood cholesterol levels in middle-aged women. In the studies, 4 g Achillea alone 3

times a week for 8 weeks had a significant effect on the reduction of LDL-C in blood levels above 200 mg/dl compared to its blood levels in pre-test.

Also, HIIT alone for 8 weeks, according to the protocol specified in subjects with LDL cholesterol level above 200 mg/dl, significantly decreased LDL cholesterol level and finally, statistical studies on the results of this study significantly decreased LDL cholesterol in blood levels above 200 mg/dl, while using Achillia plant along with HIIT.

No research has been done on the effect of Achillea consumption and simultaneous consumption of Achillia and HIIT on blood cholesterol reduction in humans. Studies on the effect of HIIT on blood cholesterol have not shown any significant decrease, but it has been reported in these studies that cholesterol levels were in normal range.

Therefore, in this study, people with cholesterol levels above 200 mg/dl were selected. In this study, Achillia consumption had significant effects on blood cholesterol levels. Similar results were also observed in HIIT and Achillia+ HIIT groups.

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